CS4001NI Programming

30% Individual Coursework 2

2022-23 Autumn

Student Name: Riza Shrestha

London Met ID: 22067117

College ID: NP01NT4A220087

Group: N4

Assignment Due Date: Wednesday, May 10, 2023

Assignment Submission Date: Wednesday, May 10, 2023

I confirm that I understand my coursework needs to be submitted online via MySecondTeacher under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a marks of zero will be awarded.

Contents

Tables of Figures

Tables of Tables

1. Introduction

1.1 Introducing Project Content

The assignment involves developing a graphic user interface (GUI) for a system that stores details of a Bank Card in an ArrayList. Here a BankGUI class will be added to the previously developed project that uses an ArrayList to store Bank Card details. The bank GUI class contains main method and is tested using the command prompt.

1.2 Tools Used

Four types of tools are used while doing this assignment as:

1. BlueJ: BlueJ is a simple, innovative, and interactive Java programming development environment created with pedagogy in mind. Users can interact with objects by doing things like inspecting their value, calling their methods, passing them as parameters, and more. The editor for BlueJ features a special scope highlighting feature that colors the background of each code block to make it easier to scan the code more quickly. A full-time team continues to maintain and provide support for it (BlueJ, 2023).
2. Drae.io: Seibert Media's Draw.io is a proprietary tool for creating diagrams and charts. It features a wide range of forms and graphic components, automatic and custom layout possibilities, drag-and-drop functionality, and more. Users have the option of saving their work to network, server, or cloud storage (Computer Hope, 2020).
3. Microsoft Word: Microsoft Word is a word processor that enables users to produce documents of professional quality, such as letters, reports, resumes, and contracts. With its advanced capabilities, it offers formatting and editing tools that enable users to create files and documents of high quality. It is one of the Office suite's most popular programs (BYJU'S, 2023).
4. Command Prompt: An operating system's or program's command prompt is a text-based user interface screen element that asks the user to perform a specific action. A small text string and a flashing cursor are usually all that's present for users to type commands into the command prompt. Users can describe the conditions under which the program shall execute by inputting a statement that contains a command name and arguments, as well as conditions like logging. When running batch files or handling system operations, the command prompt is frequently used (Kirvan, 2022).

2. Class Diagram

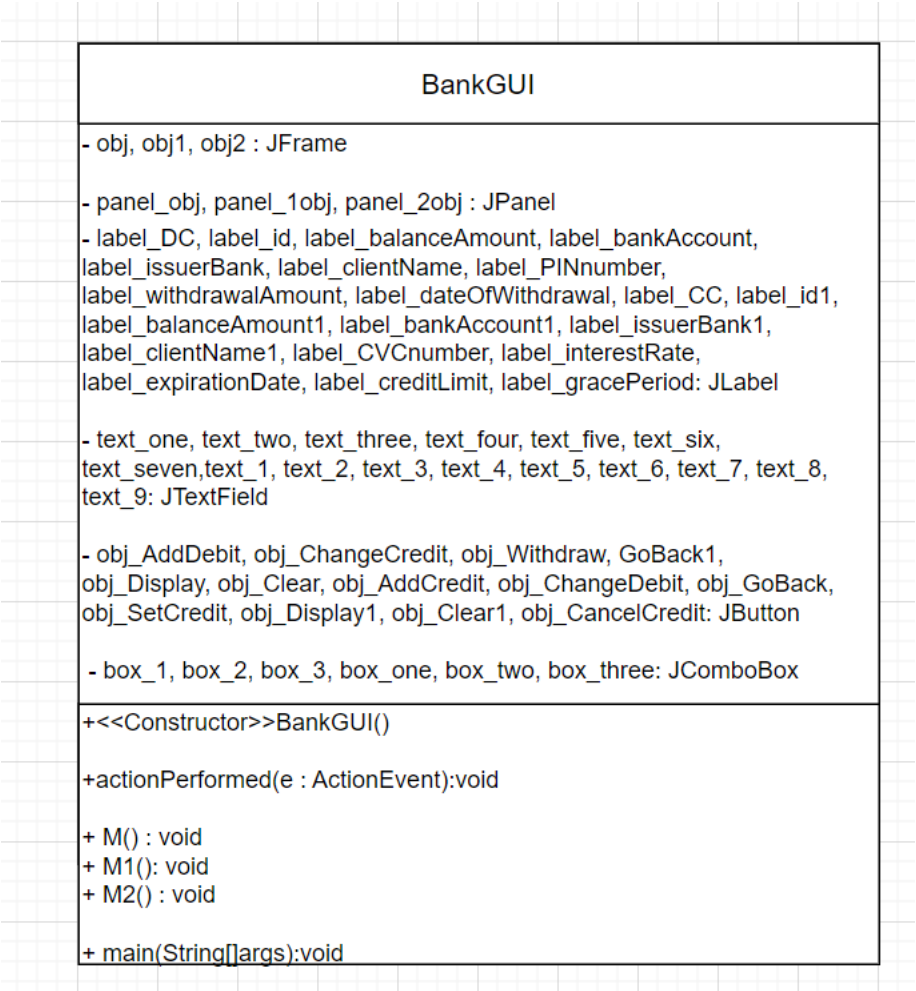

Figure 1: Class Diagram of BankGUI

3. Pseudocode

IMPORT all the classes and interfaces from javax.swing package

IMPORT all the class and interfaces from java.awt package

IMPORT all the classes and interfaces from java.io package

IMPORT all the classes and interfaces from java.awt.event package

IMPORT all the classes and interfaces from java.util.ArrayList package

IMPORT all the classes and interfaces from javax.swing.JOptionPane package

CREATE a class: BANKGUI which implements ActionListener interface

DO

DECLARE instance variables: obj, obj1, obj2 of type JFrame

DECLARE instance variables: panel_obj, panel_1obj , panel_2obj type of JPanel

DECLARE instance variables: label_DC, label_id, label_balanceAmount, label_bankAccount, label_issuerBank, label_clientName, label_PINnumber, label_withdrawalAmount, label_dateOfWithdrawal, label_CC, label_id1, label_balanceAmount1, label_bankAccount1, label_issuerBank1, label_clientName1, label_CVCnumber, label_interestRate, label_expirationDate, label_creditLimit, label_gracePeriod type of JLabel

DECLARE instance variables: text_one, text_two, text_three, text_four, text_five, text_six, text_seven, text_1, text_2, text_3, text_4, text_5, text_6, text_7, text_8, text_9 type of JTextField

DECLARE instance variables: obj_DebitCard, obj_CreditCard, obj_AddDebit, obj_ChangeCredit, obj_Withdraw, obj_GoBack1, obj_Display, obj_Clear, obj_AddCredit, obj_ChangeDebit, obj_GoBack, obj_SetCredit, obj_Display1, obj_Clear1, obj_CancelCredit type of JButton

DECLARE instance variables: box_1, box_2, box_3, box_one, box_two, box_three type of JComboBox

DECLARE and **INITIALIZE** an ArrayList of type: Bank_Card

CREATE an instance variable actionPerformed(ActionEvent e)

DO

IF the event source is equal to the obj_CreditCard

DO

CALL the M2() function

END DO

ELSE IF the event source is equal to the obj_DebitCard

DO

CALL the M1() function

END DO

ELSE IF the event source is equal to the obj_AddDebit

DO

SET balance_amount variable to the double value of text_two

SET card_id variable to the integer value of text_one

SET bank_account variable to the string value of text_three

SET issuer_bank variable to the string value of text_four

SET client_name variable to the string value of text_five

SET pin_number variable to the integer value of text_six

CREATE obj_debit with the balance_amount, card_id, issuer_bank, bank_account, client_name, pin_Number

SET a Boolean variable b to true

FOR each Bank_Card object named Bank in the Arr_List

DO

IF Bank is an instance of Debit_Card

DO

DOWNCAST the Bank object to Debit_Card

IF the card_id of Arr_List is equal to the card_id variable

DO

SET the b variable to false

END DO

END DO

END DO

IF b is equal to true

DO

ADD the obj_debit to the Arr_List

DISPLAY a success message using JOptionPane.showMessageDialog with "The debit card has been added successfully" as the message on panel_1obj

ENDIF

ELSEIF b is equal to false

DO

DISPLAY a message using JOptionPane.showMessageDialog “This card id ” + card_id + “already exists”) on the panel_1obj

END DO

END DO

ELSE IF the event source is equal to the obj_withdraw

DO

SET card_id variable to the integer value of text_one text field

SET withdrawal_amount variable to the double value of text_seven text field

SET pin_number variable to integer value of text_six text field

SET Day to string value of the selected item in the box_1 combo box

SET Month to string value of the selected item in the box_2 combo box

SET Year to string value of the selected item in the box_3 combo box

CONCATENATE the Day, Month and Year strings into a single date_of_Withdrawal string variable

FOR each card in Arr_List

DO

IF card is an instance of Debit_Card

DO

DOWNCAST the card object to DebitCard

IF the card_id of Arr_List is equal to the card_id variable

DO

DISPLAY a message box using JOptionPane.showMessageDialog() method with panel_1obj as the parent component and the message string as message component

CALL withdraw method from Debit_Card object

DISPLAY a message box using JOptionPane.showMessageDialog with panel_1obj as the parent component

ELSE

DISPLAY a message box using JOptionPane.showMessageDialog with panel_1obj as the parent component

ENDIF

IF the input pin_number of is equal to the pin_number of Debit_Card object

DO

IF the withdrawal_amount is less than or equal to the current balance the DebitCard object

DO

CALL debit.withdraw(withdrawal_amount, date_of_Withdrawal, pin_Number)

DISPLAY a success message using the JOptionPane.showMessageDialog() method with with "Balance withdrawal successful." + "\n" + "Withdrawal amount is: " + withdrawal_amount + "\n" + "The left over balance is: " + debit.getbalance_amount() as the message and the panel_1obj as the parent component.

ELSE

DISPLAY a message box using JOptionPane.showMessageDialog with "Not enough balance" as the message and panel_1obj as the parent component

END IF

ELSE

DISPLAY a message box using JOptionPane.showMessageDialog with "Wrong Pin Number" as the message and panel_1obj as the parent component

ENDIF

ENDIF

END FOR

ENDIF

ELSE IF the event source is equal to the obj_Display

DO

TRY

DO

SET debit_cardID variable to the integer parsed of text_one text field

SET debit_balanceAmount variable to the double value of text_two text field

SET debit_bankAccount variable to the value of text_three text field

SET debit_issuerBank variable to string value of text_four text field

SET debit_clientName variable to value of text_five text field

SET debit_pinNumber variable to integer value of text_six text field

SET debit_withdrawalAmount variable to the parsed of text_seven text field

SET debit_Date to string value of the selected item in the box_1 combo box

SET debit_Month to string value of the selected item in the box_2 combo box

SET debit_Year to string value of the selected item in the box_3 combo box

CONCATENATE the debit_Date, debit_Month and debit_Year strings into a single debit_withdrawalDate string variable

FOR each card in the Arr_List

DO

IF card is an instance of DebitCard THEN

SET debitCard to card as Debit_Card

CALL the display() method on the debitCard

ENDIF

ENDFOR

CATCH Exception exception

CALL JOptionPane.showMessageDialog with "Invalid Input" as the message and panel_1obj as the parent component

ENDTRY

ENDIF

ELSE IF the event source is equal to the obj_Clear

DO

SET text_one to an empty string

SET text_two to an empty string

SET text_three to an empty string

SET text_four to an empty string

SET text_five to an empty string

SET text_six to an empty string

SET text_seven to an empty string

SET box_1 selected index to 0

SET box_2 selected index to 0

SET box_3 selected index to 0

DISPLAY a message dialog using JOptionPane.showMessageDialog with "Cleared" as the message and panel_1obj as the parent component

END DO

ELSE IF the event source is equal to the obj_GoBack1

DO

CALL M() method

ENDIF

ELSE IF the event source is equal to the obj_ChangeCredit

DO

CALL M2() method

ENDIF

ELSE IF the event source is equal to the obj_AddCredit

DO

SET card_id variable to the integer value of text_1

SET balance_amount variable to the integer value of text_2

SET bank_account variable to the value of text_3

SET issuer_bank variable to the value of text_4

SET client_name variable to the value of text_5

SET cvc_number variable to the integer value of text_6

SET interest_rate variable to the double value of text_7

SET DAY to string value of the selected item in the box_one combo box

SET MONTH to string value of the selected item in the box_two combo box

SET YEAR to string value of the selected item in the box_three combo box

CONCATENATE the DAY, MONTH and YEAR strings into a single expiration_date string variable

SET a Boolean variable b1 to true

FOR each Bank_Card object named Bank in the Arr_List

DO

IF Bank is an instance of Credit_Card

DO

DOWNCAST the Bank object to Credit_Card

IF the card_id of Arr_List is equal to the card_id variable

DO

SET the b1 variable to false

END DO

END DO

END DO

IF b1 is equal to true

DO

ADD the obj_credit to the Arr_List

DISPLAY a success message using JOptionPane.showMessageDialog with "Sucessfully added Credit Card" as the message on panel_2obj

ENDIF

ELSE

DO

DISPLAY a message using JOptionPane.showMessageDialog “This card id ” + card_id + “already exists”) on the panel_2obj

END DO

END DO

ELSE IF the event source is equal to the obj_GoBack1

DO

CALL M() method

ENDIF

ELSE IF the event source is equal to the obj_ChangeDebit

DO

CALL M1() method

ENDIF

ELSE IF the event source is equal to the obj_SetCredit

DO

SET card_id variable to the integer value of text_1

SET grace_period variable to the integer value of text_9

SET credit_limit variable to the integer value of text_8

FOR each Bank in Arr_List

DO

IF Bank is instance of Credit_Card

DO

Convert Bank to Credit_Card

IF credit card_id equal card_id

DO

DISPLAY string message "The Grace Period is : " + grace_period + "\n" + "The Credit Limit is : " + credit_limit

Show message in JOptionPane on panel_2obj

IF credit_limit is less than or equal to credit's balance_amount times 2.5

DO

CALL credit's setcredit_card method with credit_limit and grace_period as arguments

Show "Credit Limit successfully updated" in JOptionPane on panel_2obj

ELSE

Show "The credit limit cannot be greater than 2.5 times the current balance" in JOptionPane on panel_2obj

ENDIF

ELSE

Show "Card id not found. Please enter a valid card id" in JOptionPane on panel_2obj

ENDIF

ENDIF

END FOR

ENDIF

ELSE IF the event source is equal to the obj_CancelCredit

DO

SET card_id variable to the integer value of text_1 text field
FOR each Bank_Card object named bC in the Arr_List

DO

IF bC is an instance of Credit_Card

DO

DOWNCAST the bC object to Credit_Card named Arr_List list

IF the card_id of Arr_List is equal to the card_id variable

DO

CALL the cancelCreditCard() method of ‘obj_credit’

DISPLAY a message dialog with the text “Credit card successfully cancelled.”

END DO

ELSE

DO

DISPLAY a message dialog with the text "Card id not found. Please enter a valid card id"

END DO

END DO

END DO

END DO

ELSE IF the event source is equal to the obj_Display1

DO

TRY

DO

SET card_id variable to the integer parsed of text_1

SET client_name variable to value of text_5

SET issuer_bank variable to string value of text_4

SET bank_account variable to the value of text_3

SET balance_amount variable to the double value of text_2

SET cvc_number variable to the integer value of text_6

SET interest_rate variable to the double value of text_7

SET credit_Day to string value of the selected item in the box_one combo box

SET credit_Month to string value of the selected item in the box_two combo box

SET credit_Year to string value of the selected item in the box_three combo box

CONCATENATE the credit_Day, credit_Month and credit_Year strings into a single expiration_date string variable

FOR each Bank_Card object named b_obj in the Arr_List

DO

IF b_obj is an instance of Credit_Card

DO

DOWNCAST the b_obj object to Credit_Card named Arr_List

CALL the display() method on the Credit_card object

END DO

END DO

END DO

CATCH Exception exception

DO

DISPLAY an error message using the JOptionPane.showMessageDialog() method, with the panel_2obj as the parent component and " Invalid Input " as the message parameter

END DO

END DO

ELSE IF the event source is equal to the obj_Clear1

DO

SET text_1 to empty string

SET text_2 to empty string

SET text_3 to empty string

SET text_4 to empty string

SET text_5 to empty string

SET text_6 to empty string

SET text_7 to empty string

SET text_8 to empty string

SET text_9 to empty string

SET box_one selected index to 0

SET box_two selected index to 0

SET box_three selected index to 0

CALL JOptionPane.showMessageDialog with message "Cleared"

ENDIF

DO

CREATE an instance method M

INITIALIZE obj to new JFrame

SET the title of obj to Coursework GUI

SET the bounds of obj to 15,10, 650,500

SET resizable of obj to true

INITIALIZE panel_obj to new JPanel

SET the bounds of panel_obj to 0,0,750,550

SET background colour of panel_obj to #E6E6FA

SET layout of panel_obj to null

INITIALIZE obj_DebitCard to new JButton with text “Debit Card”

SET the bound of obj_DebitCard to (75,70,500,150)

SET the font of obj_DebitCard to Arial, Font.BOLD,55

SET the background colour of obj_DebitCard to #FFFAFA

ADD the obj_DebitCard to panel_obj

ADD an action listener to obj_DebitCard

INITIALIZE obj_CreditCard to new JButton with text “Credit Card”

SET the bound of obj_CreditCard to (75,270,500,150)

SET the font of obj_CreditCard to Arial, Font.BOLD,55

SET the background colour of obj_CreditCard to #FFFAFA

ADD the obj_CreditCard to panel_obj

ADD an action listener to obj_CreditCard

ADD the obj to the panel_obj

SET the visibility of obj true

END DO

DO

CREATE an instance method M1

INITIALIZE obj1 to new JFrame

SET the title of obj1 to Coursework GUI

SET bounds of obj1 to 15,10,650,500

SET resizable of obj2 to true

INITIALIZE panel_1obj to new JPanel

SET bounds of panel_1obj to 0,0,650,500

SET background of panel_1obj to "#E6E6FA"

SET layout of panel_1obj to null

INITIALIZE label_DC to new JLabel with text “Debit Card”

SET bounds of label_DC to 260,10,200,50

SET the font of label_DC to ("Arial",Font.PLAIN,25)

ADD the label_DC to panel_1obj

INITIALIZE label_id to new JLabel with text “Card id”

SET bounds of label_id to 30,30,120,130

SET the font label_id to ("Arial",Font.PLAIN,15)

ADD the label_id1 to panel_1obj

INITIALIZE label_balanceAmount to new JLabel with text “Balance amount”

SET bounds of label_balanceAmount to 30,70,120,130

SET the font of label_balanceAmount to ("Arial",Font.PLAIN,15)

ADD the label_balanceAmount to panel_1obj

INITIALIZE label_bankAccount to new JLabel with text “Bank account”

SET bounds of label_bankAccount to 30,110,120,130

SET the font of label_bankAccount to ("Arial",Font.PLAIN,15)

ADD the label_bankAccount to panel_1obj

INITIALIZE label_issuerBank to new JLabel with text “Issuer Bank”

SET bounds of label_issuerBank to 350,30,120,130

SET the font of label_issuerBank to ("Arial",Font.PLAIN,15)

ADD the label_issuerBank1 to panel_1obj

INITIALIZE label_ clientName to new JLabel with text “Client name”

SET bounds of label_ clientName to 350,70,120,130

SET the font of label_ clientName to ("Arial",Font.PLAIN,15)

ADD the label_ clientName to panel_1obj

INITIALIZE label_ PINnumberto new JLabel with text “PIN number”

SET bounds of label_ PINnumber to 350,110,120,130

SET the font of label_ PINnumber to ("Arial",Font.PLAIN,15)

ADD the label_ PINnumber to panel_1obj

INITIALIZE label_ withdrawalAmount to new JLabel with text “Withdrawal amount”

SET bounds of label_ withdrawalAmount to 30,220,200,130

SET the font of label_ withdrawalAmount to ("Arial",Font.PLAIN,15)

ADD the label_ withdrawalAmount to panel_1obj

INITIALIZE label_ dateOfWithdrawal to new JLabel with text “Date of Withdrawal”

SET bounds of label_ dateOfWithdrawal to 30,260,200,130

SET the font of label_ dateOfWithdrawal to ("Arial",Font.PLAIN,15)

ADD the label_ dateOfWithdrawal to panel_1obj

INITIALIZE text_one to new JTextField

SET bounds of text_one to 160,85,120,21

SET background color of text_one to WHITE

SET the font of text_one to ("Arial",Font.PLAIN,15)

ADD the text_one to panel_1obj

INITIALIZE text_two to new JTextField

SET bounds of text_two to 160,125,120,21

SET background color of text_two to WHITE

SET the font of text_two to ("Arial",Font.PLAIN,15)

ADD the text_two to panel_1obj

INITIALIZE text_three to new JTextField

SET bounds of text_three to 160,165,120,21

SET background color of text_three to WHITE

SET the font of text_three to ("Arial",Font.PLAIN,15)

ADD the text_three to panel_1obj

INITIALIZE text_four to new JTextField

SET bounds of text_four to 450,85,120,21

SET background color of text_four to WHITE

SET the font of text_four to ("Arial",Font.PLAIN,15)

ADD the text_four to panel_1obj

INITIALIZE text_five to new JTextField

SET bounds of text_five to 450,125,120,21

SET background color of text_five to WHITE

SET the font of text_five to ("Arial",Font.PLAIN,15)

ADD the text_five to panel_1obj

INITIALIZE text_six to new JTextField

SET bounds of text_six to 450,165,120,21

SET background color of text_six to WHITE

SET the font of text_six to ("Arial",Font.PLAIN,15)

ADD the text_six to panel_1obj

INITIALIZE text_seven to new JTextField

SET bounds of text_seven to 150,275,120,21

SET background color of text_seven to WHITE

SET the font of text_seven to ("Arial",Font.PLAIN,15)

ADD the text_seven to panel_1obj

INITIALIZE obj_AddDebit to new JButton with text “Add Debit Card”

SET bounds of obj_AddDebit to 85,220,145,21

SET background color of obj_AddDebit to WHITE

SET the font of obj_AddDebit to ("Arial",Font.PLAIN,15)

ADD the obj_AddDebit to panel_1obj

ADD an action listener to obj_AddDebit

INITIALIZE obj_ChangeCredit to new JButton with text “Change to Credit Card”

SET bounds of obj_ChangeCredit to 370,220,185,21

SET background color of obj_ChangeCredit to WHITE

SET the font of obj_ChangeCredit to("Arial",Font.PLAIN,15)

ADD the obj_ChangeCredit to panel_1obj

ADD an action listener to obj_ChangeCredit

INITIALIZE obj_Withdraw to new JButton with text “Withdraw”

SET bounds of obj_Withdraw to 100,380,100,21

SET background color of obj_Withdraw to WHITE

SET the font of obj_Withdraw to ("Arial",Font.PLAIN,15)

ADD the obj_Withdraw to panel_1obj

ADD an action listener to obj_Withdraw

INITIALIZE obj_GoBack1 to new JButton with text “Go Back”

SET bounds of obj_GoBack1 to 440,270,95,21

SET background color of obj_GoBack1 to WHITE

SET the font of obj_GoBack1 to("Arial",Font.PLAIN,15)

ADD the obj_GoBack1 to panel_1obj

ADD an action listener to obj_GoBack1

INITIALIZE obj_Display to new JButton with text “Display”

SET bounds of obj_Display to 300,380,90,21

SET background color of obj_Display to WHITE

SET the font of obj_Display to ("Arial",Font.PLAIN,15)

ADD the obj_Display to panel_1obj

ADD an action listener to obj_Display

INITIALIZE obj_Clear to new JButton with text “Clear”

SET bounds of obj_Clear to 500,380,90,21

SET background color of obj_Clear to WHITE

SET the font of obj_Clear ("Arial",Font.PLAIN,15)

ADD the obj_Clear to panel_1obj

ADD an action listener to obj_Clear

INITIALIZE box_1 to new JComboBox

SET bounds of box_1 to 180,315,50,21

SET background color of box_1 to WHITE

SET the font of box_1 to ("Arial",Font.PLAIN,15)

ADD the box_1 to panel_1obj

ADD items to box_1 using a for loop

CREATE a string array with month names

INITIALIZE box_2 to new JComboBox

SET bounds of box_2 to 260,315,100,21

SET background color of box_2 to WHITE

SET the font of box_2 to ("Arial",Font.PLAIN,15)

ADD the box_2 to panel_1obj

INITIALIZE box_3 to new JComboBox

SET bounds of box_3 to 390,315,60,21

SET background color of box_3 to WHITE

SET the font of box_3 to ("Arial",Font.PLAIN,15)

ADD the box_3 to panel_1obj

ADD items to box_3 using a for loop

ADD the obj1 to the panel_1obj

SET the visibility of obj1 to true

END

DO

CREATE an instance method M2

INITIALIZE obj2 to new JFrame

SET the title of obj2 to Coursework GUI

SET bounds of obj2 to 15,10,650,500

SET layout of obj2 to null

SET resizable of obj2 to true

INITIALIZE panel_2obj to new JPanel

SET bounds of panel_2obj to 0,0,650,500

SET background of panel_2obj to "#E6E6FA"

SET layout of panel_2obj to null

INITIALIZE label_CC to new JLabel with text “Credit Card”

SET bounds of label_CC to 260,10,100,50

SET the font of label_CC to ("Arial",Font.PLAIN,25)

ADD the label_CC to panel_2obj

INITIALIZE label_id1 to new JLabel with text “Card id”

SET bounds of label_id1 to 30,30,120,130

SET the font label_id1 to ("Arial",Font.PLAIN,15)

ADD the label_id1 to panel_2obj

INITIALIZE label_balanceAmount1 to new JLabel with text “Balance amount”

SET bounds of label_balanceAmount1 to 30,70,120,130

SET the font of label_balanceAmount1 to ("Arial",Font.PLAIN,15)

ADD the label_balanceAmount1 to panel_2obj

INITIALIZE label_bankAccount1 to new JLabel with text “Bank account”

SET bounds of label_bankAccount1 to 30,110,120,130

SET the font of label_bankAccount1to ("Arial",Font.PLAIN,15)

ADD the label_bankAccount1 to panel_2obj

INITIALIZE label_issuerBank1 to new JLabel with text “Issuer Bank”

SET bounds of label_issuerBank1 to 350,30,120,130

SET the font of label_issuerBank1 to ("Arial",Font.PLAIN,15)

ADD the label_issuerBank1 to panel_2obj

INITIALIZE label_ clientName1to new JLabel with text “Client name”

SET bounds of label_ clientName1 to 350,70,120,130

SET the font of label_ clientName1 to ("Arial",Font.PLAIN,15)

ADD the label_ clientName1to panel_2obj

INITIALIZE label_ CVCnumberto new JLabel with text “CVC number”

SET bounds of label_ CVCnumber to 350,110,120,130

SET the font of label_ CVCnumber to ("Arial",Font.PLAIN,15)

ADD the label_ CVCnumber to panel_2obj

INITIALIZE label_ interestRate to new JLabel with text “Interest Rate”

SET bounds of label_ interestRate to 30,220,200,130

SET the font of label_ interestRate to ("Arial",Font.PLAIN,15)

ADD the label_ interestRate to panel_2obj

INITIALIZE label_ expirationDate to new JLabel with text “ Expiration Date”

SET bounds of label_ expirationDate to 30,260,200,130

SET the font of label_ expirationDate to ("Arial",Font.PLAIN,15)

ADD the label_ expirationDate to panel_2obj

INITIALIZE label_ creditLimit to new JLabel with text “Credit Limit”

SET bounds of label_ creditLimit to 30,300,180,130

SET the font of label_ creditLimit to ("Arial",Font.PLAIN,15)

ADD the label_ creditLimit to panel_2obj

INITIALIZE label_ gracePeriod to new JLabel with text “Grace Period”

SET bounds of label_ gracePeriod to 350,300,180,130

SET the font of label_ gracePeriod to ("Arial",Font.PLAIN,15)

ADD the label_ gracePeriod to panel_2obj

INITIALIZE text_1 to new JTextField

SET bounds of text_1 to 160,85,120,21

SET background color of text_1 to WHITE

SET the font of text_1 to ("Arial",Font.PLAIN,15)

ADD the text_1 to panel_2obj

INITIALIZE text_2 to new JTextField

SET bounds of text_2 to 160,125,120,21

SET background color of text_2 to WHITE

SET the font of text_2 to ("Arial",Font.PLAIN,15)

ADD the text_2 to panel_2obj

INITIALIZE text_3 to new JTextField

SET bounds of text_3 to 160,165,120,21

SET background color of text_3 to WHITE

SET the font of text_3 to ("Arial",Font.PLAIN,15)

ADD the text_3 to panel_2obj

INITIALIZE text_4 to new JTextField

SET bounds of text_4 to 450,85,120,21

SET background color of text_4 to WHITE

SET the font of text_4 to ("Arial",Font.PLAIN,15)

ADD the text_4 to panel_2obj

INITIALIZE text_5 to new JTextField

SET bounds of text_5 to 450,125,120,21

SET background color of text_5 to WHITE

SET the font of text_5 to ("Arial",Font.PLAIN,15)

ADD the text_5 to panel_2obj

INITIALIZE text_6 to new JTextField

SET bounds of text_6 to 450,165,120,21

SET background color of text_6 to WHITE

SET the font of text_6 to ("Arial",Font.PLAIN,15)

ADD the text_6 to panel_2obj

INITIALIZE text_7 to new JTextField

SET bounds of text_7 to 150,275,120,21

SET background color of text_7 to WHITE

SET the font of text_7 to ("Arial",Font.PLAIN,15)

ADD the text_7 to panel_2obj

INITIALIZE text_8 to new JTextField

SET bounds of text_8 to 150,355,120,21

SET background color of text_8 to WHITE

SET the font of text_8 to ("Arial",Font.PLAIN,15)

ADD the text_8 to panel_2obj

INITIALIZE text_9 to new JTextField

SET bounds of text_9 to 450,355,120,21

SET background color of text_9 to WHITE

SET the font of text_9 to ("Arial",Font.PLAIN,15)

ADD the text_9 to panel_2obj

INITIALIZE obj_AddCredit to new JButton with text “Add Credit Card”

SET bounds of obj_AddCredit to 85,220,145,21

SET background color of obj_AddCredit to WHITE

SET the font of obj_AddCreditto ("Arial",Font.PLAIN,15)

ADD the obj_AddCredit to panel_2obj

ADD an action listener to obj_AddCredit

INITIALIZE obj_ChangeDebit to new JButton with text “Change to Debit Card”

SET bounds of obj_ChangeDebit to 400,275,185,21

SET background color of obj_ChangeDebit to WHITE

SET the font of obj_ChangeDebit to("Arial",Font.PLAIN,15)

ADD the obj_ChangeDebit to panel_2obj

ADD an action listener to obj_ChangeDebit

INITIALIZE obj_GoBack to new JButton with text “Go Back”

SET bounds of obj_GoBack to 440,315,95,21

SET background color of obj_GoBack to WHITE

SET the font of obj_GoBack to("Arial",Font.PLAIN,15)

ADD the obj_GoBack to panel_2obj

ADD an action listener to obj_GoBack

INITIALIZE obj_SetCredit to new JButton with text “Set Credit Limit”

SET bounds of obj_SetCredit to 100,400,140,21

SET background color of obj_SetCredit to WHITE

SET the font of obj_SetCredit to ("Arial",Font.PLAIN,15)

ADD the obj_SetCredit to panel_2obj

ADD an action listener to obj_SetCredit

INITIALIZE obj_Display1 to new JButton with text “Display”

SET bounds of obj_Display1 to 320,400,90,21

SET background color of obj_Display1 to WHITE

SET the font of obj_Display1 to ("Arial",Font.PLAIN,15)

ADD the obj_Display1 to panel_2obj

ADD an action listener to obj_Display1

INITIALIZE obj_Clear1 to new JButton with text “Clear”

SET bounds of obj_Clear1 to 500,400,80,21

SET background color of obj_Clear1 to WHITE

SET the font of obj_Clear1 ("Arial",Font.PLAIN,15)

ADD the obj_Clear1 to panel_2obj

ADD an action listener to obj_Clear1

INITIALIZE obj_CancelCredit to new JButton with text “Cancel Credit Card”

SET bounds of obj_CancelCredit to 370,220,170,21

SET background color of obj_CancelCredit to WHITE

SET the font of obj_CancelCredit to ("Arial",Font.PLAIN,15)

ADD the obj_CancelCredit to panel_2obj

ADD an action listener to obj_CancelCredit

INITIALIZE box_one to new JComboBox

SET bounds of box_one to 150,315,50,21

SET background color of box_one to WHITE

SET the font of box_one to ("Arial",Font.PLAIN,15)

ADD the box_one to panel_2obj

ADD items to box_one using a for loop

CREATE a string array with month names

INITIALIZE box_two to new JComboBox

SET bounds of box_two to 215,315,100,21

SET background color of box_two to WHITE

SET the font of box_two to ("Arial",Font.PLAIN,15)

ADD the box_two to panel_2obj

INITIALIZE box_three to new JComboBox

SET bounds of box_three to 330,315,60,21

SET background color of box_three to WHITE

SET the font of box_three to ("Arial",Font.PLAIN,15)

ADD the box_three to panel_2obj

ADD items to box_three using a for loop

ADD the obj2 to the panel_2obj

SET the visibility of obj2 to true

END

4. Method Description

4.1 For ActionListener

S.N	Method Name	Description
1.	obj_CreditCard	This method handles the functionality of a Credit Card button. When the button is clicked, it calls the method M2() to display a form for entering information about a Credit card.
	obj_DebitCard	This method handles the functionality of a Debit Card button. When the button is clicked, it calls the method M1() to display a form for entering information about a Debit card.
3.	obj_AddDebit	This method handles the functionality of a Add Debit Card, button which retrieves input values from JTextField, creates a new Debit_Card object, and checks whether the card_id is unique by iterating through the ArrayList. The new object is added to the array list, and a success message is shown if the card_id is unique. An error message appears if the card_id already exists.
4.	obj_Withdraw	This method handles the functionality of a Withdraw button, which retrieves input values from a JTextField and a ComboBox. It checks if a debit card exists with the provided card ID and withdraws money if both the pin and balance number are valid. It displays a suitable message for success or

		errors.
5.	obj_Display	This method handles the functionality of a Display button for debit card, which retrieves input values from JTextField and ComboBox and uses them to create a Debit_Card object. The method then iterates over an ArrayList of Bank_Card objects to find instances of Debit_Card, and displays the details of the card using a message dialog box. If an exception is caught during the process, an error message is displayed instead.
6.	obj_Clear	This method handles the functionality of a Clear button, which clears all input values from JTextField and resets all ComboBox to their default values. It then displays a message box to indicate that the fields have been cleared.
7.	obj_GoBack1	This method handles the functionality of a Go Back button in Debit Card. When the button is clicked, it calls the method M() to return the user back to the main menu.
8.	obj_ChangeCredit	This method handles the functionality of a Change to Credit Card button. When the button is clicked, it calls the method M2() to return the user to the Credit card form.

9.	obj_AddCredit	This method handles the functionality of an Add Credit Card" button, which retrieves input values from a JTextField and a ComboBox, which creates a new Credit_Card object, and checks whether the card_id is unique by iterating through the ArrayList. If the card_id is unique, the new Credit_Card object is added to the ArrayList, and a success message is displayed. If the card_id already exists in the array list, an error message is displayed.
10.	obj_GoBack	This method handles the functionality of a Go Back button in Credit card. When the button is clicked, it calls the method M() to return the user back to the main menu
11.	obj_ChangeDebit	This method handles the functionality of a Change to Debit Card button. When the button is clicked, it calls the method M1() to return the user to the Debit card form.
12.	obj-SetCredit	This method handles the functionality of a Set Credit Limit button, which retrieves input values from a JTextField. It updates the credit limit and grace period of a credit card in the Arr_List based on the input card id. It creates a new Credit_Card object, checks for the unique card_id, displays the current grace period and credit limit, and checks if the new credit limit entered is valid (not more than 2.5 times the current balance). If the new limit is valid, it updates the credit card object and displays a

		success message. If not, it displays an error message.
13.	obj_CancelCredit	This method handles the functionality of a Cancel Credit button, which retrieves the input value of a card ID from a JTextField. It searches for the credit card object in the Arr_List based on the card ID, and if found, cancels the credit card object and displays a success message. If the card ID is not found, it displays an error message.
14.	obj_Display1	This method handles the functionality of a Display button for credit card, which retrieves input values from JTextField and ComboBox and uses them to create a Credit_Card object. The method then iterates over an ArrayList of Bank_Card objects to find instances of Credit_Card, and displays the details of the card using a message dialog box. If an exception is caught during the process, an error message is displayed instead.
15.	obj_Clear1	This method handles the functionality of a Clear button for Credit card, which clears all input values from JTextField and resets all ComboBox to their default values. It then displays a message box to indicate that the fields have been cleared.

Table 1: Method description of BankGUI for ActionListener

4.2 For M()

S.N	Method	Description
1.	obj	This method creates a JFrame and sets the title, bounds, size, visibility and resizeable and is added to panel_obj.
2.	panel_obj	This method create a JPanel and set the layout, bounds, and background color..
3.	obj_DebitCard	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_obj and ActionListener
4.	obj_CreditCard	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_obj and ActionListener

Table 2: Method description of BankGUI for M()

4.3 For M1()

S.N	Method	Description
1.	obj1	This method creates a JFrame and sets the title, bound, size, visibility and resizeable and is added to panel_1obj.
2.	panel_1obj	This method create a JPanel and set the layout, bounds, and background color.
3.	label_DC	This method creates a JLabel, sets its font, and bounds and is added to the panel_1obj.
4.	label_id	This method creates a JLabel, sets its font, and bounds and is added to the panel_1obj.
5.	label_balanceAmount	This method creates a JLabel, sets its font, and bounds and is added to the panel_1obj.
6.	label_bankAccount	This method creates a JLabel, sets its font, and bounds and is added to the panel_1obj.
7.	label_issuerBank	This method creates a JLabel, sets its font, and bounds and is added to the panel_1obj.

8.	label_clientName	This method creates a JLabel, sets its font, and bounds and is added to the panel_1obj.
9.	label_PINnumber	This method creates a JLabel, sets its font, and bounds and is added to the panel_1obj.
10.	label_withdrawalAmount	This method creates a JLabel, sets its font, and bounds and is added to the panel_1obj.
11.	label_dateOfWithdrawal	This method creates a JLabel, sets its font, and bounds and is added to the panel_1obj.
12.	text_one	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_1obj.
13.	text_two	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_1obj.
14.	text_three	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_1obj.
15.	text_four	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_1obj.

16.	text_five	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_1obj.
17.	text_six	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_1obj.
18.	text_seven	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_1obj.
19.	obj_AddDebit	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_1obj and ActionListener.
20.	obj_ChangeCredit	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_1obj and ActionListener.
21.	obj_Withdraw	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_1obj and ActionListener.
22.	obj_GoBack1	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_1obj and ActionListener.
23.	obj_Display	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_1obj and ActionListener.

24.	obj_Clear	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_1obj and ActionListener.
25.	box_1	This method creates a JComboBox, sets its bound, background color, and font, and is added to the panel_1obj.
26.	box_2	This method creates a JComboBox, sets its bound, background color, and font, and is added to the panel_1obj.
27.	box_3	This method creates a JComboBox, sets its bound, background color, and font, and is added to the panel_1obj.

Table 3: Method description of BankGUI for M1()

4.4 For M2()

S.N	Method	Description
1.	obj2	This method creates a JFrame and sets the title, bound, size, visibility and resizeable and is added to panel_2obj.
2.	panel_2obj	This method create a JPanel and set the layout, bounds, and background color.
3.	label_CC	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.
4.	label_id1	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.
5.	label_balanceAmount1	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.
6.	label_bankAccount1	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.
7.	label_issuerBank1	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.
8.	label_clientName1	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.

9.	label_CVCnumber	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.
10.	label_interestRate	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.
11.	label_expirationDate	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.
12.	label_creditLimit	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.
13.	label_gracePeriod	This method creates a JLabel, sets its font, and bounds and is added to the panel_2obj.
14.	text_1	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_2obj.
15.	text_2	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_2obj.
16.	text_3	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_2obj.
17.	text_4	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_2obj.
18.	text_5	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_2obj.

19.	text_6	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_2obj.
20.	text_7	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_2obj.
21.	text_8	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_2obj.
22.	text_9	This method creates a JTextField, sets its bounds, background color, font, and is added to the panel_2obj.
23.	obj_AddCredit	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_2obj and ActionListener.
24.	obj_ChangeDebit	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_2obj and ActionListener.
25.	obj_GoBack	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_2obj and ActionListener.
26.	obj_SetCredit	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_2obj and ActionListener.
27.	obj_Display1	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_2obj and ActionListener.

28.	obj_Clear1	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_2obj and ActionListener.
29.	obj_CancelCredit	This method creates a JButton, sets its bound, background color, and font, and is added to the panel_2obj and ActionListener.
30.	box_one	This method creates a JComboBox, sets its bound, background color, and font, and is added to the panel_2obj.
31.	box_two	This method creates a JComboBox, sets its bound, background color, and font, and is added to the panel_2obj.
32.	box_three	This method creates a JComboBox, sets its bound, background color, and font, and is added to the panel_2obj.

Table 4: Method description of BankGUI for M2()

5 Testing

5.1 Test 1: Test that the program can be compiled and run using the command prompt.

Test No.	1
Objective	To Test that the program can be compiled and run using the command prompt.
Action	Compile and run the program using command prompt.
Expected result	The GUI of BannkGUI class should appears.
Actual result	The GUI of BannkGUI class should appears.
Conclusion	The test is successful.

Table 5: Test 1- To Test that the program can be compiled and run using the command prompt.

Output Result for Test 1:

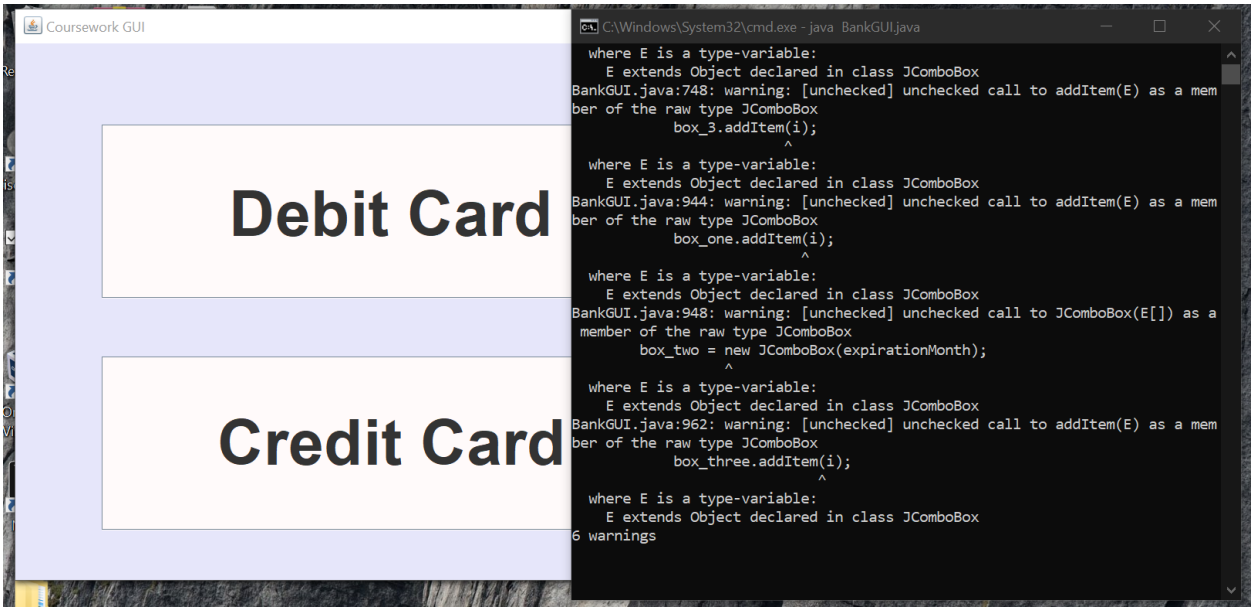

Figure 2: Screenshot of Test 1

5.2 Test 2: evidence of

5.2.1 Add debit card

Test	2.1
Object	To show evidence of Add Debit Card
Action	Assign the value in Card id , Balance amount, Balance account, Issuer Bank, Client name, PIN number. Card id = 1 Balance amount = 1000 Bank account = 1453400 Issuer Bank = Laxmi Client name = Amisha PIN number = 1286 Click on Add Debit Card Button
Expected result	“The debit card has been added successfully” dialog should be displayed.
Actual result	“The debit card has been added successfully” dialog was displayed.
Conclusion	Th test is successful.

Table 6: Test 2.1 - Add Debit Card

Output Result for Test 2.1:

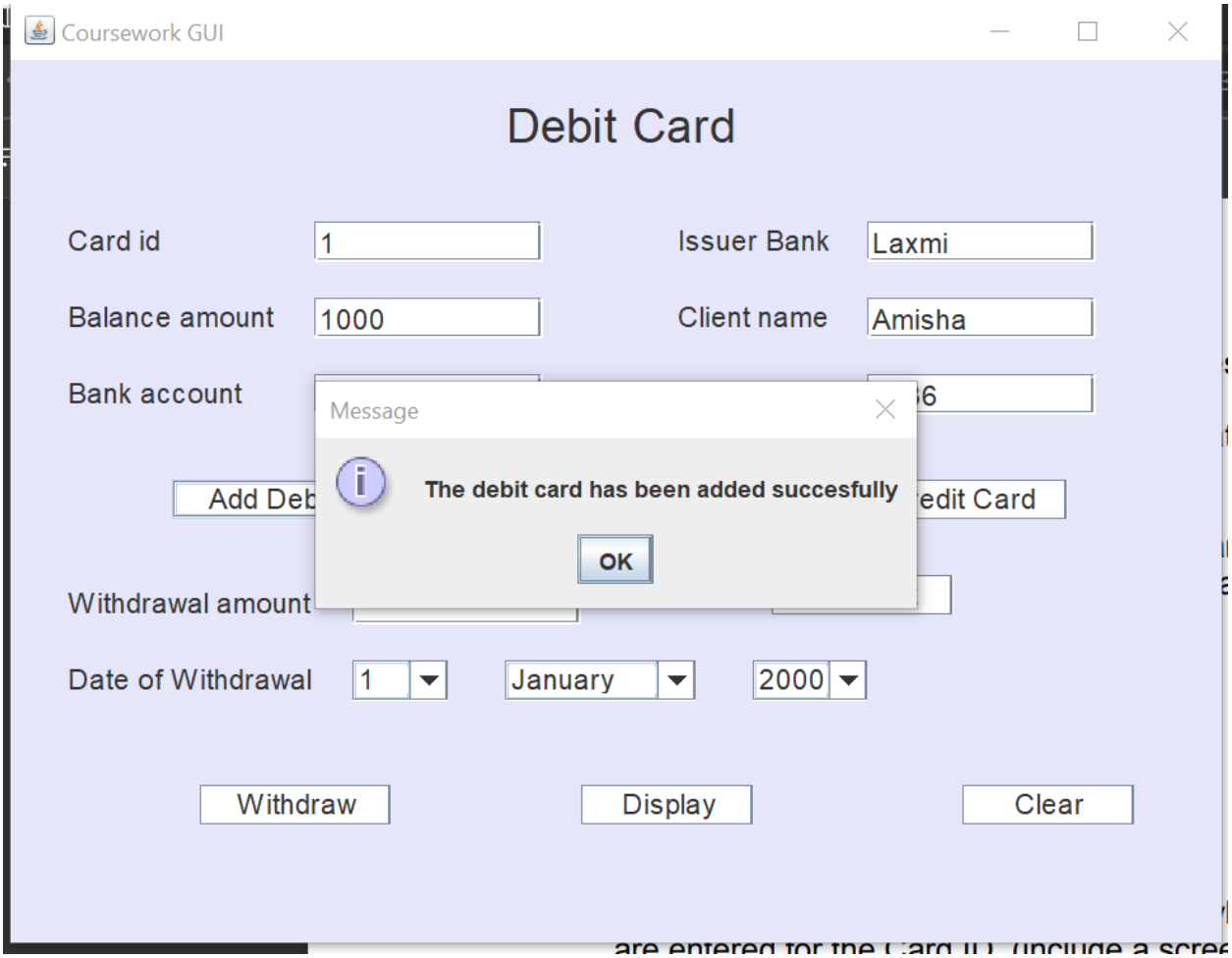

Figure 3: Screenshot of Test 2.1

5.2.2 Add Credit Card

Test	2.2
Objective	To show evidence of Add Credit card
Action	Assign the value in Card id , Balance amount, Balance account, Issuer Bank, Client name, CVC number, Interest Rate. Card id = 5 Balance amount = 2000 Balance account = 130004 Issuer Bank = Laxmi Client name = Kipa CVC number = 312 Interest Rate = 12 Click on Add Credit Card Button
Expected result	“ Successfully added Credit Card “dialog should be displayed.
Actual result	“ Successfully added Credit Card “dialog was displayed.
Conclusion	The test is successful.

Table 7: Test 2.2 - To add credit card

Output Result for Test 2.2:

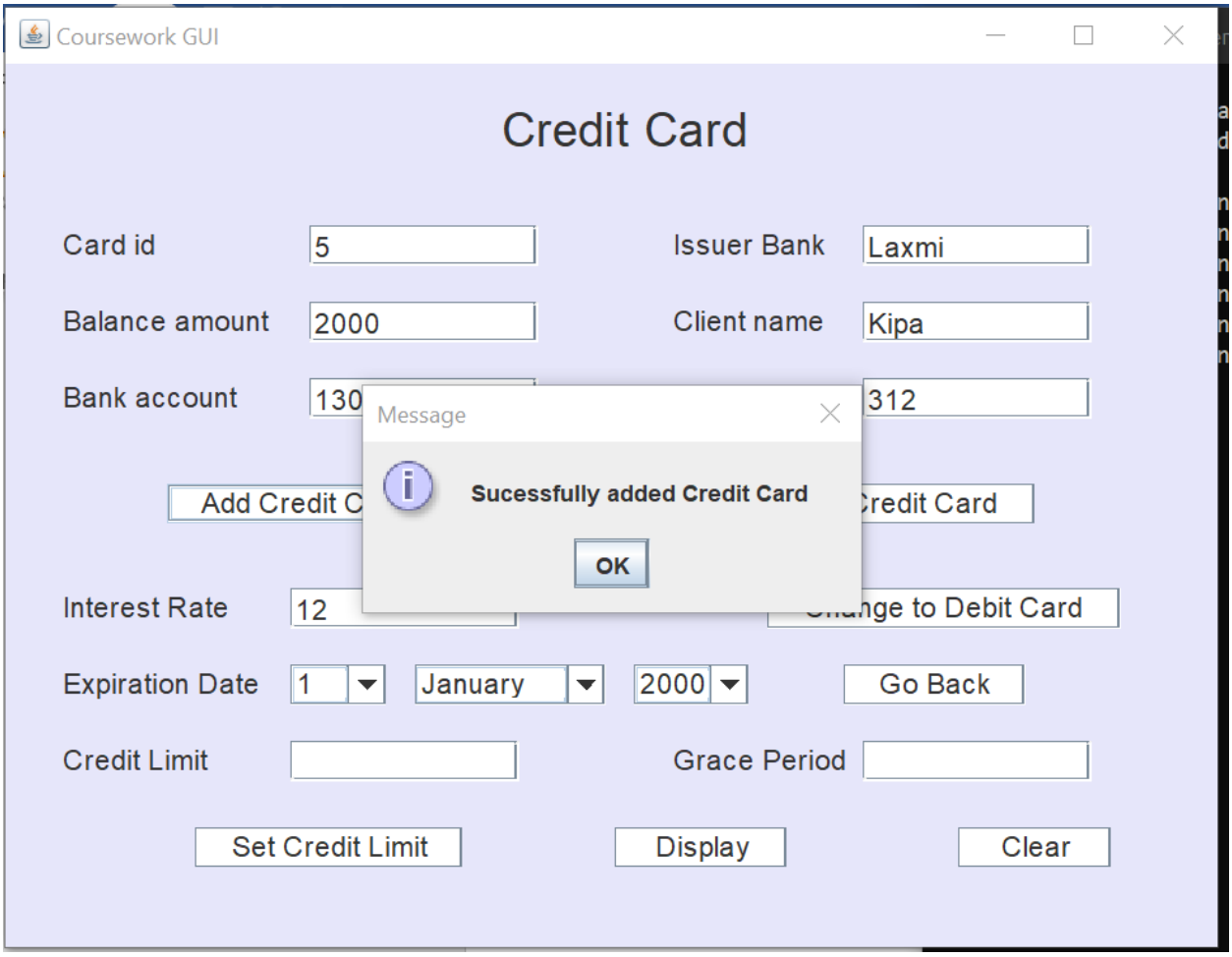

Figure 4: Screenshot of Test 2.2

5.2.3 Withdraw amount from debit card

Test	2.3
Object	To show the evidence of Withdraw amount from Debit card
Action	Assign the value in Card id , Balance amount, Bank account, Issuer Bank, PIN number, Withdrawal amount, Date of Withdrawal. Card id = 1 Balance amount = 1000 Bank account = 110004 Issuer Bank = Laxmi Client name = Amisha PIN number = 1986 Withdrawal Amount = 100 Date of Withdrawal = 9 May 2023 Click on Withdraw Button
Expected result	Card id , Balance amount, Balance account, Issuer Bank, PIN number, Withdrawal amount, Date of Withdrawal should be displayed. and the leftover balance should also be displayed.
Conclusion	The test is successful.

Table 8: Test 2.3 - To Withdraw amount from Debit card

Output Result of Test 2.3:

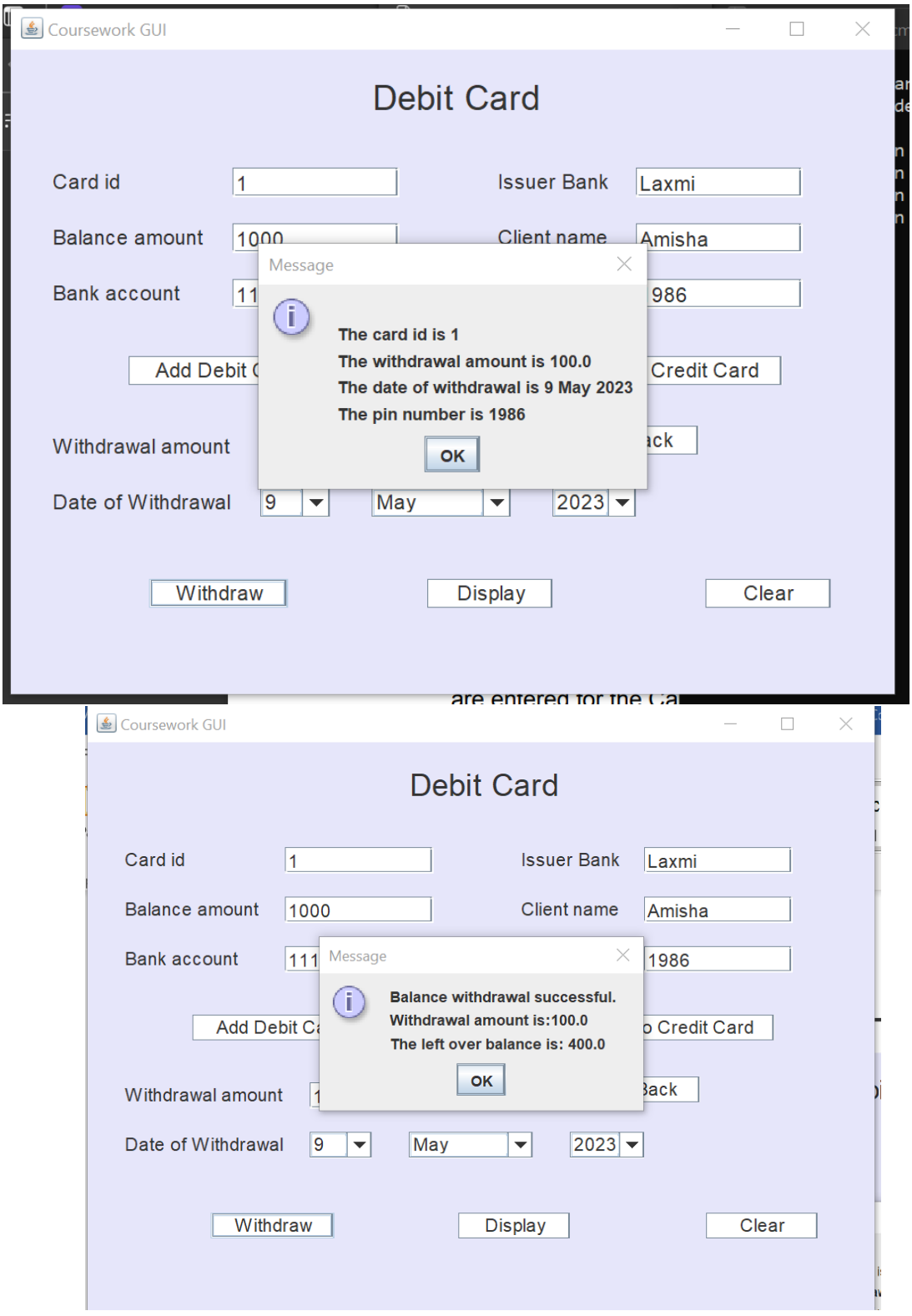

Figure 5: Screenshot of Test 2.3

5.2.4 Set the credit limit

Test	2.4
Object	To show the evidence of set the credit limit
Action	Assign the value in Card id , Balance amount, Bank account, Issuer Bank, Client name, CVC number, Interest Rate, Expiration Date, Credit Limit, Grace period. Card id = 5 Balance amount = 2000 Bank account = 130004 Issuer Bank = Laxmi Client name = Kipa CVC number = 312 Interest Rate = 12 Expiration Date = 6 May 2023 Credit Limit = 500 Grace Period = 2 Click on Set Credit Limit Button
Expected Result	Credit Limit and Grace period should be displayed and credit limit successfully updated should also be displayed.
Actual Result	Credit Limit and Grace period was displayed and credit limit successfully updated was displayed.
Conclusion	The test is successful.

Table 9: Test 2.4 - To set the credit limit

Output Result of Test 2.4:

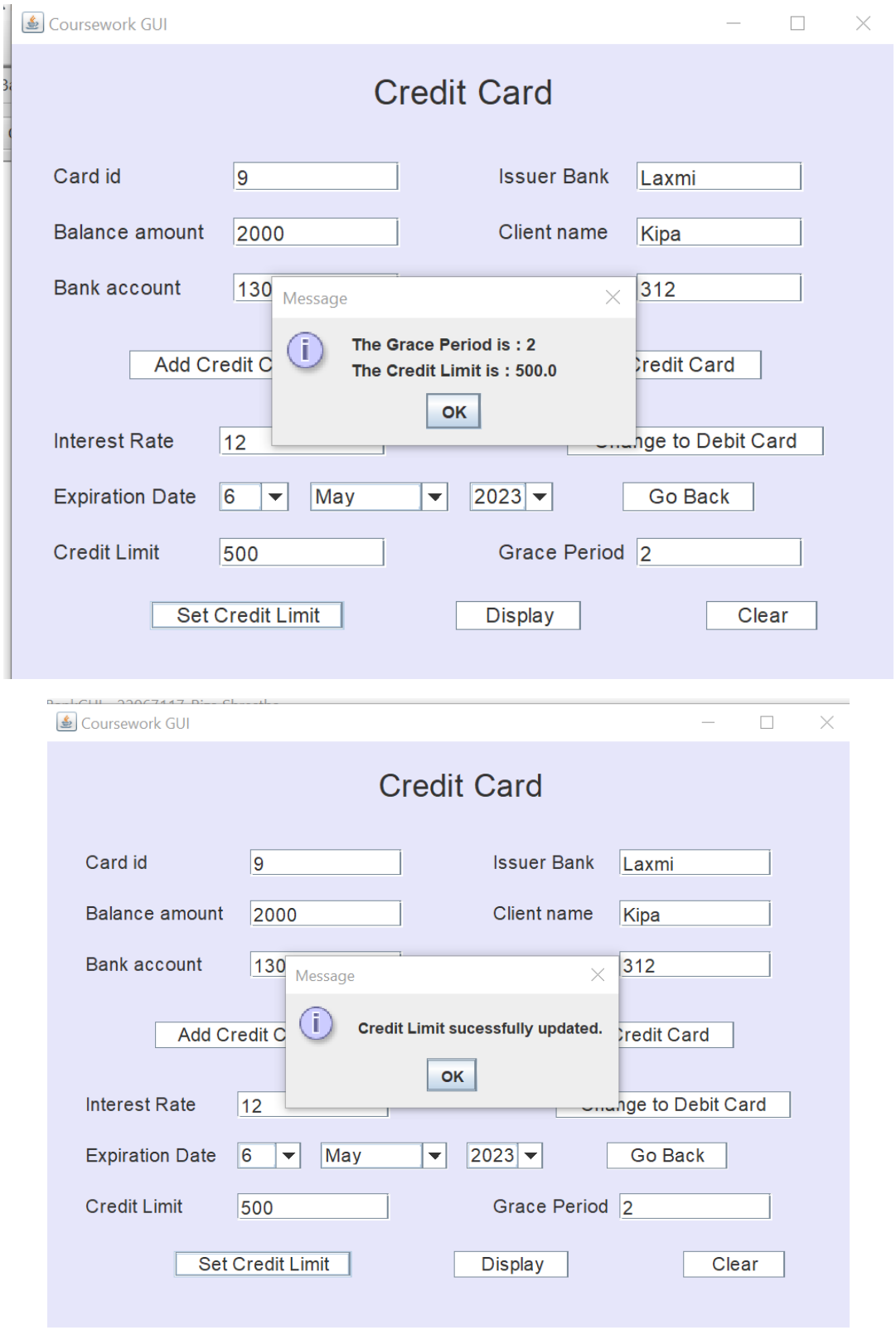

Figure 6: Screenshot of Test 2.4

5.2.5 Remove the credit card

Test	2.5
Object	To show the evidence of remove the credit card
Action	Assign the value in Card id , Balance amount, Bank account, Issuer Bank, Client name, CVC number, Interest Rate, Expiration Date, Credit Limit, Grace period. Card id = 5 Balance amount = 2000 Bank account = 130004 Issuer Bank = Laxmi Client name = Kipa CVC number = 312 Interest Rate = 12 Expiration Date = 6 May 2023 Credit Limit = 500 Grace Period = 2 Click on cancel Credit Card Button
Expected Result	“Credit card successfully cancelled” message should be displayed.
Actual Result	“Credit card successfully cancelled” message was displayed.
Conclusion	The test is successful.

Table 10:Test 2.5 To remove credit card

Output Result of Test 2.5:

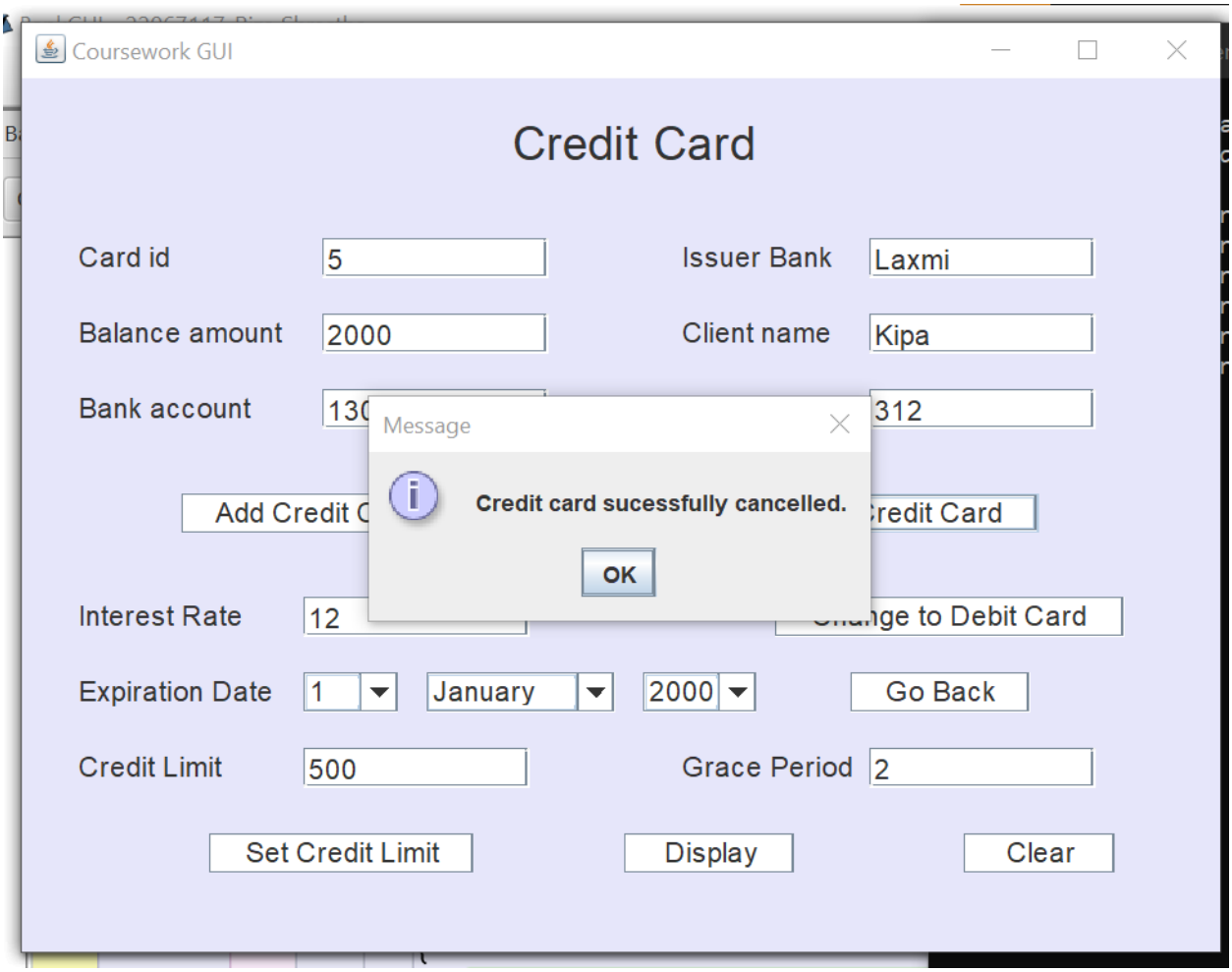

Figure 7: Screenshot of Test 2.5

5.2.6 Test 3.1: Test that appropriate dialog boxes appear when unsuitable values are entered for the Card ID in Debit Card

Test	**3.1**
Object	To test the appropriate dialog boxes appear when unsuitable values are entered for the Card ID
Action	Assign the value in Card id , Balance amount, Bank account, Issuer Bank, PIN number, Card id = 1 Balance amount = 1000 Bank account = 132000 Issuer Bank = Laxmi Client name = Amisha PIN number = 1545 Click on Add to Debit Card button
Expected Result	“The Card id 1 already exists” should be displayed.
Actual Result	“The Card id 1 already exists” was displayed .
Conclusion	The test was successful.

Table 11:Test 3.1 that appropriate dialog boxes appear when unsuitable values are entered for the Card ID in Debit Card

Output Result of Test 3.1:

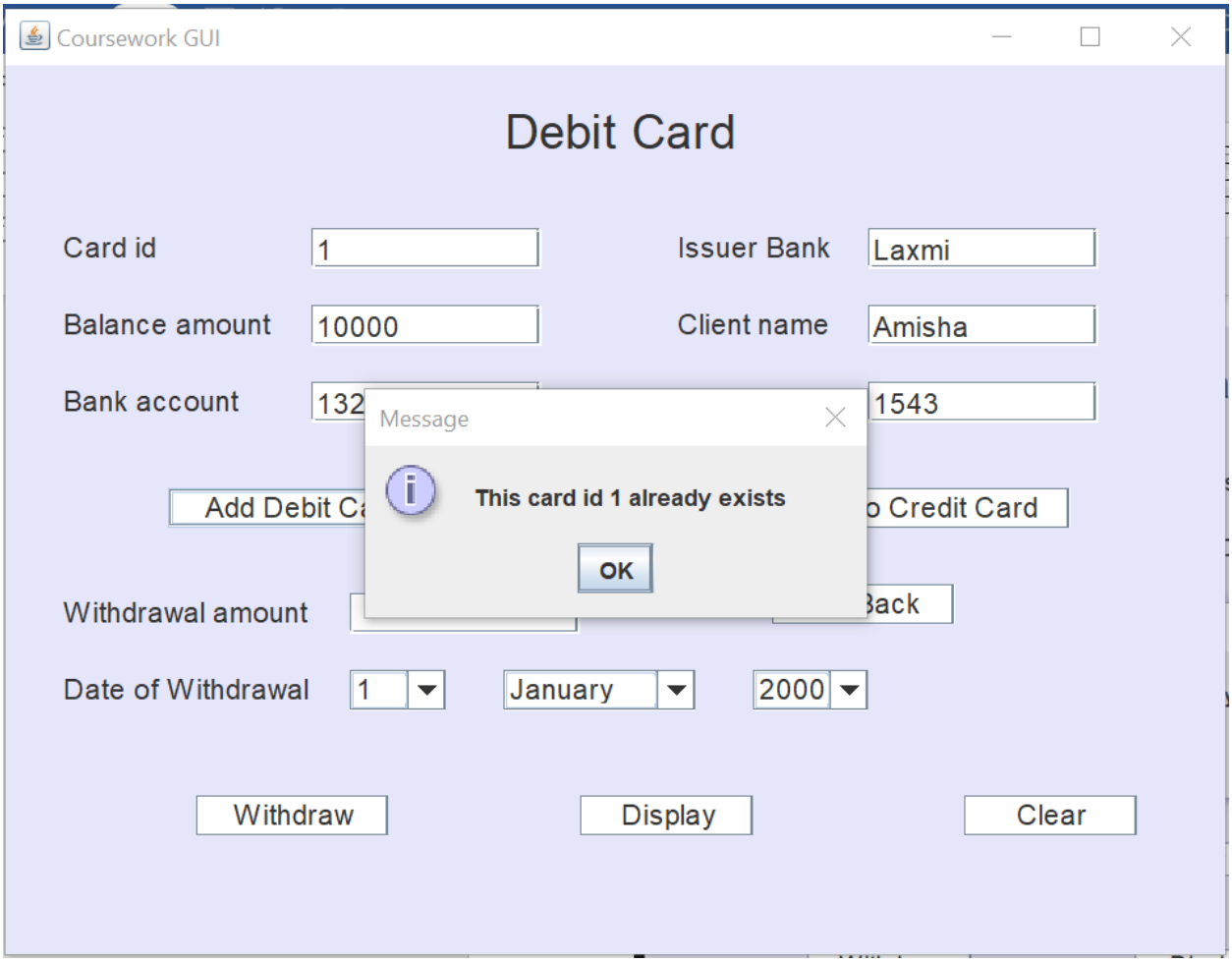

Figure 8:Screenshot of Test 3.1

5.2.7 Test 3.2: Test that appropriate dialog boxes appear when unsuitable values are entered for the Card ID in Credit Card

Test	**3.2**
Object	To test the appropriate dialog boxes appear when unsuitable values are entered for the Card ID
Action	Assign the value in Card id , Balance amount, Bank account, Issuer Bank, Client name, CVC number, Interest Rate. Card id = 5 Balance amount = 5000 Bank account = 120004 Issuer Bank = Laxmi Client name = Kipa CVC number = 312 Interest Rate = 12 Click on Add Credit Card Button
Expected Result	“The Card id 5 already exists” should be displayed.
Actual Result	“The Card id 5 already exists” was displayed .
Conclusion	The test was successful.

Table 12:Test – 3.2 To test the appropriate dialog boxes appear when unsuitable values are entered for the Card ID in Credit card

Output Result of Test 3.2:

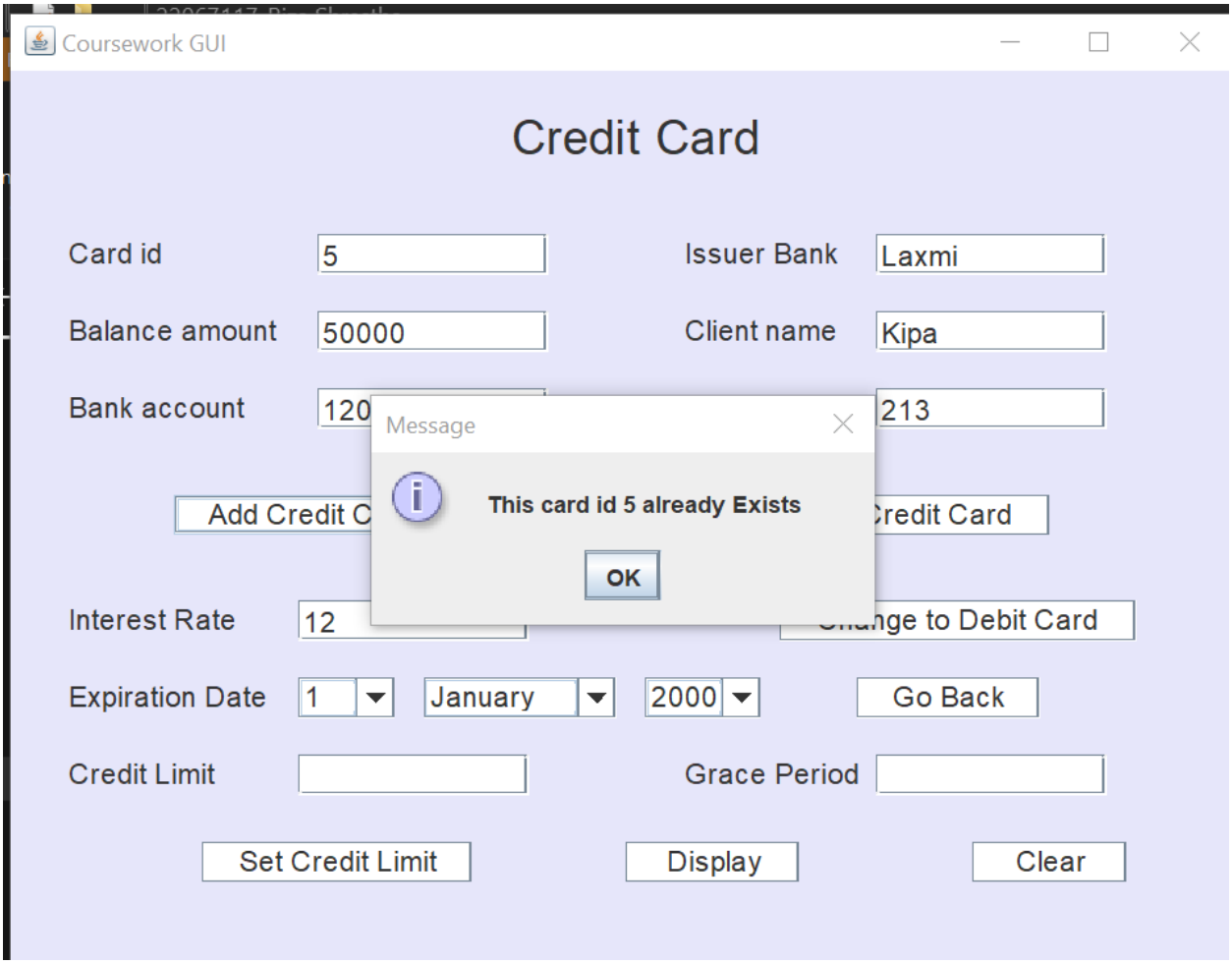

Figure 9: Screenshot of Test 3.2

6 Different Error Detection and Correction

6.2 Syntax Error

6.2.1 Syntax Error Detection

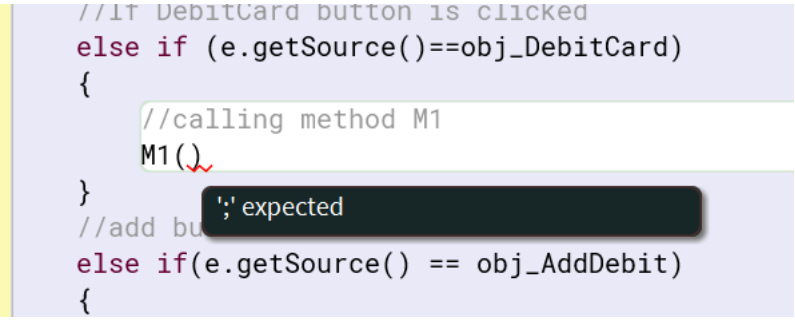

Figure 10: Screenshot of Syntax Error Dection

The syntax error was detected in M1() when it found that a semicolon was missing.

6.2.2 Syntax Error Correction

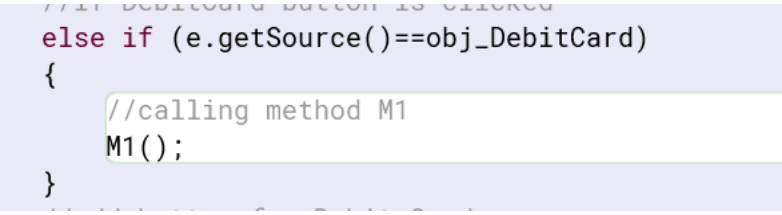

Figure 11: Screenshot of Syntax Error Correction

The error was corrected by adding a semicolon to the end of the line.

6.3 Semantic Error

6.3.1 Semantic Error Detection

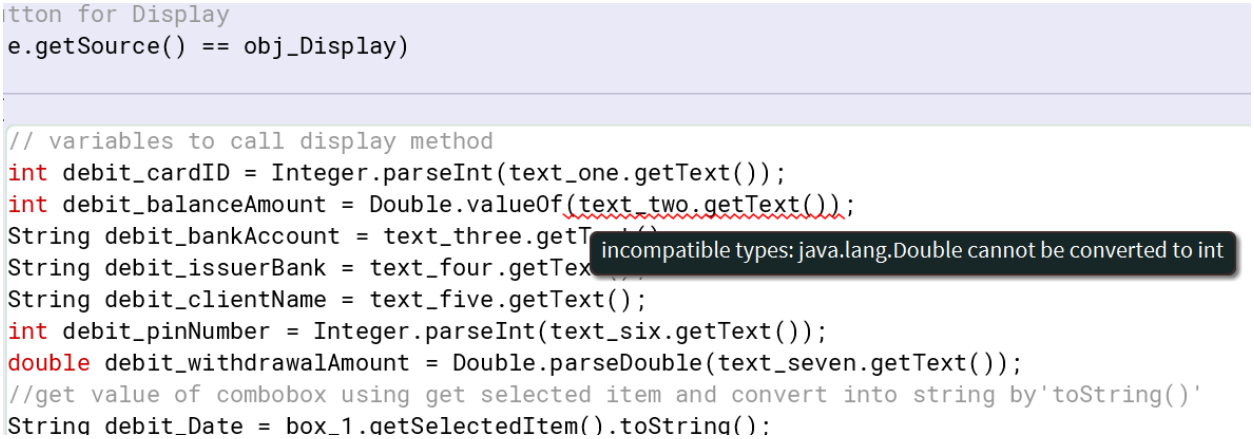

Figure 12: Screenshot of Semantic Error Detection

The semantic error is detected when an integer was assigned to the vaiable debit_balanceAmount.

6.3.2 Semantic Error Correction

```
d button for Display
 if(e.getSource() == obj_Display)

try{
    // variables to call display method
    int debit_cardID = Integer.parseInt(text_one.getText());
    double debit_balanceAmount = Double.valueOf(text_two.getText());
    String debit_bankAccount = text_three.getText();
    String debit_issuerBank = text_four.getText();
    String debit_clientName = text_five.getText();
```

Figure 13: Screenshot of Semantic Error Correction

The Semantic error was corrected by clearly defining the data type double for the variable debit_balanceAmount.

6.4 Logical Error

6.4.1 Logical Error Detection

```
if(debit.getcard_id() == card_id)
{
    //Display a message box to show the input information.
    JOptionPane.showMessageDialog(panel_1obj,
    "\nThe card id is " + card_id +
    "\nThe withdrawal amount is " + withdrawal_amount +
    "\nThe date of withdrawal is " +  card_id +
    "\nThe pin number is " + pin_Number);

    //calling withdraw method from Debit_Card object
    debit.withdraw(withdrawal_amount,date_of_Withdrawal, pin_Num
```

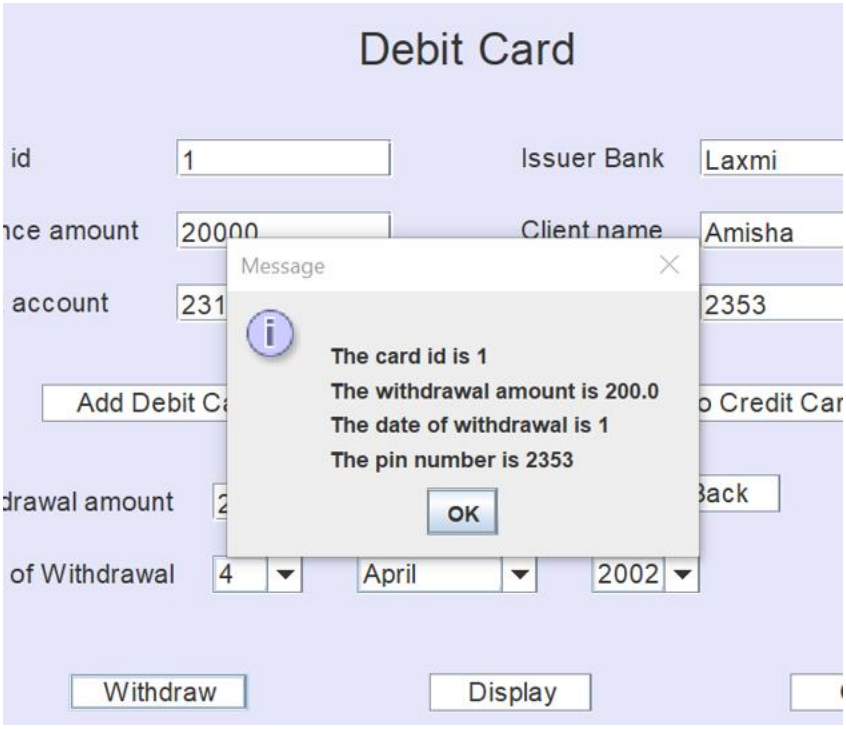

Figure 14: Screenshot of Logical Error Detection

The logical error was detected when the variable card_id was mistakenly assigned to message box displaying the date of withdrawal.

6.4.2 Logical Error Correction

```
if(debit.getcard_id() == card_id)
{
    //Display a message box to show the input information.
    JOptionPane.showMessageDialog(panel_1obj,
    "\nThe card id is " + card_id +
    "\nThe withdrawal amount is " + withdrawal_amount +
    "\nThe date of withdrawal is " + date_of_Withdrawal +
    "\nThe pin number is " + pin_Number);
```

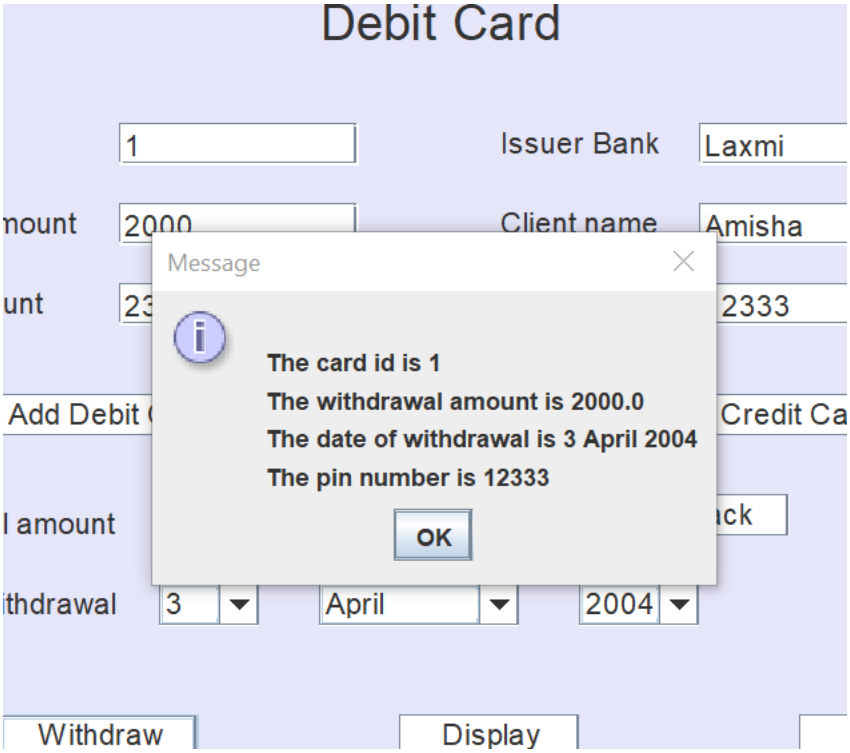

Figure 15: Screenshot of Logical Error Correction

The Logical error was corrected by assigning the value of date_of_Withdrawal to the date of withdrawal message box.

6 Conclusion

In conclusion, this coursework was a great learning opportunity for me as it helped me learn about GUL programming in JAVA and principles related to object-oriented programming. Here I have created a BankGUI application that lets users to add, cancel and display bank cards, including credit and debit cards.

One of the main challenges I face during the project was that the JButton was not working properly, but I was able to resolve it asking sir for the help and identifying the root cause of the issue.

Overall, I had an amazing experience doing the BankGUI coursework and learned a lot about Java programming, GUI development, and object-oriented programming. I was able to improve my problem-solving abilities and learn how to handle challenging programming.

7. References

BlueJ, 2023. *About BlueJ.* [Online]
Available at:
https://www.bluej.org/about.html#:~:text=BlueJ%20is%20a%20development%20environment,environments%20like%20NetBeans%20or%20Eclipse.
[Accessed 5 May 2023].

BYJU'S, 2023. *What is MS Word? - Basics, Uses, Features & Questions.* [Online]
Available at: https://byjus.com/govt-exams/microsoft-word/
[Accessed 5 May 2023].

Computer Hope, 2020. *What is Draw.io?.* [Online]
Available at: https://www.computerhope.com/jargon/d/drawio.htm
[Accessed 5 May 2023].

Kirvan, P., 2022. *What is a command prompt?.* [Online]
Available at: https://www.techtarget.com/whatis/definition/command-prompt#:~:text=A%20command%20prompt%20is%20the,designed%20to%20elicit%20an%20action.
[Accessed 5 May 2023].